Solid state NMR and diatoms: probing the interfaces
Sylvie Masse, Guillaume Laurent,

To cite this version:

HAL Id: hal-01138970
http://hal.upmc.fr/hal-01138970
Submitted on 3 Apr 2015

HAL is a multi-disciplinary open access archive for the deposit and dissemination of scientific research documents, whether they are published or not. The documents may come from teaching and research institutions in France or abroad, or from public or private research centers.

L’archive ouverte pluridisciplinaire HAL, est destinée au dépôt et à la diffusion de documents scientifiques de niveau recherche, publiés ou non, émanant des établissements d’enseignement et de recherche français ou étrangers, des laboratoires publics ou privés.

Distributed under a Creative Commons Attribution - NonCommercial - NoDerivatives 4.0 International License
Whole-cell, SDS-treated and H₂O₂-treated samples were isotopically enriched with Δ²Si, ¹³C/²⁹Si/²⁹N and ³¹C/³¹N, respectively. While SDS is used to clean the frustule, H₂O₂ treatment seems to be much more aggressive, probably leading to partial dissolution-recrystallization.

Liquid-state-inspired NMR experiments mainly highlight the most mobile species: unsaturated lipids. Nevertheless ENSY exp. shows spin diffusion between two broad protons regions.

Solid-state NMR experiments allow to probe another part of the sample: the rigid one. Playing with the selected nuclei, spatial proximities can be assessed.

While a lot of work is still needed to fully understand diatoms frustule interface, solid-state NMR appears to be a powerful toolbox. Indeed, this technique is able to selectively probe either mobile or rigid species at a very local scale. Varying methods, species proximity can be checked and connectivity evaluated.